

The Einstein-Maxwell-aether-axion theory: Dynamo-optical anomaly in the electromagnetic response

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Abstract

© 2016 World Scientific Publishing Company. We consider a pp-wave symmetric model in the framework of the Einstein-Maxwell-aether-axion theory. Exact solutions to the equations of axion electrodynamics are obtained for the model, in which pseudoscalar, electric and magnetic fields were constant before the arrival of a gravitational pp-wave. We show that dynamo-optical interactions, i.e. couplings of electromagnetic field to a dynamic unit vector field, attributed to the velocity of a cosmic substratum (aether, vacuum, dark fluid...), provide the response of axionically active electrodynamic system to display anomalous behavior.

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Keywords

dark matter axions, dynamo-optical phenomena, Unit vector field